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SEVENTH

ANNUAL REPORT

OF THE

BOARD OF TRUSTEES OF THE BUILDING FUND

OF THE

Academy of Natural Sciences of Philadelphia

TO THE

CONTRIBUTORS TO THE FUND.

JANUARY, 1874.

With regards of

PHILADELPHIA:
COLLINS, PRINTER, 705 JAYNE STREET.
1874.

REPORT.

UNDER a resolution of the Academy adopted March 27, 1866, W. S. W. Ruschenberger, M.D., Joseph Leidy, M.D., Frederick Graff, John S. Haines, Ed. S. Whelen, John Welsh, William S. Vaux, Thomas Sparks, Robert Bridges, M.D., Joseph Jeanes, Henry C. Gibson, John H. Redfield, and George W. Tryon, Jr., were, January 14, 1873, duly elected a Board of Trustees of the Building Fund of the Academy of Natural Sciences of Philadelphia, for one year.

The Board met January 17th, 1873. Dr. Ruschenberger was elected chairman, Mr. Vaux, Treasurer, and Mr. Tryon, Secretary.

Messrs. Sparks, Whelen, Jeanes, Gibson, and Welsh were duly elected the Committee on Finance; and Messrs. Ruschenberger, Vaux, Bridges, Graff, Leidy, Gibson, and Tryon, the Committee on Building.

Specifications and estimates necessary to continue the construction of the building were ordered to be furnished by the architect. February 14th the estimates were submitted and examined; and, March 21st, the Board authorized the committee on building to make contracts equal to $43,000, provided this amount should be sufficient to set in position the beams of the museum or main floor. The amount of the appropriation was thus limited, because the deed of trust properly provides that no contract for materials or work shall be made "until the whole amount of funds necessary to carry out such contract shall be actually subscribed."

The working drawings having been completed, the building committee instructed the architect, April 7th, to invite eight

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reputable builders to submit proposals for constructing the building in continuation of the work already done last year, the bids to specify the cost of separate sections of the edifice, the *first* including the setting of the beams of the museum floor; the *second*, the first gallery; the *third*, the second gallery of the museum; the *fourth*, the walls up to the cornice, and the *fifth*, inclosing the building with the roof; and in like manner to invite separate proposals from four iron manufacturers for the iron work required in the construction of floors, roof, etc.

April 21st the Committee considered the several proposals received and awarded the contracts to the lowest bidders.

Some of the piers which had been constructed late in the season last year had to be taken down and rebuilt, because the mortar had frozen. This circumstance somewhat delayed the commencement of new work this year.

June 2d, a contract for the iron-work required in construction up to and including the beams for the museum floor was made with the Phœnix Iron Company for $20,735 52. And, June 10th, a contract to continue the construction up to and including the setting of the beams of the museum floor was made with William Armstrong for $21,250. The aggregate of these contracts is $41,985 52, or $1014 48 less than the amount appropriated by the Board of Trustees.

The walls have been built twenty feet above the water table. The iron beams of the first or library floor, of the entresol floor, and of the museum floor have been laid, and the structure covered for the winter. The walls have to be built twenty-nine feet higher before they will be ready to receive the roof.

To inclose the building with a fire-proof roof will cost, according to the lowest bids made, $77,664 48, or in round numbers $78,000. And to complete the interior of this wing will require, it is estimated, $76,500 more, or in round numbers a total of $154,500.

If the work can be resumed early in the coming spring the edifice can be completed and ready for the reception of the collections by the first of May, 1875. To transfer them from the old building and properly arrange them in the new one will require a long time, probably a year at least, so that we must resume work early next March in order that the museum may be ready to receive visitors during the centennial celebration, which is to begin April, 1876.

The condition of the treasury and the list of available subscriptions in February next must determine the date of the resumption of the work.

The report of the treasurer, dated December 12, 1873, is in substance:—

Balance Dec. 13, 1872 . . .	$29,280 64	
Received on account of old subscriptions	2,398 00	
Received on account of new subscriptions	19,960 00	
Received on account of interest, etc.	1,624 35	
		$53,262 99
Expended for water-rent, taxes, contingent expenses, etc. . . .	$ 1,468 76	
On account of contracts for building	32,716 00	
		$34,184 76
Balance		19,078 23
Amount to be paid on account of contracts, say		18,000 00
Cash on hand to commence work in 1874		$1,078 23
Add, old subscriptions unpaid, probably good	$ 7,000 00	
Old subscriptions, probably bad, $2325.		
Old subscriptions, payable in materials	900 00	
New subscriptions unpaid . . .	13,100 00	
Due in 1874 on special subscriptions	11,250 00	
		$25,250 00
Amount estimated to be available in 1874		$26,328 23

In addition to cash in the treasury and the aggregate of subscriptions not paid, Dec. 12, there is required to inclose the building with its roof $51,336 25, or in round numbers $52,000 more than the amount now available, according to the treasurer's statement.

The aggregate of contracts for the building since its commencement is $55,710 52. Of this sum there remains unpaid, say $18,000. This balance will be settled in the course of a few weeks, when the existing contracts have been completed.

Having briefly stated the condition of the work entrusted to this Board, as well as the state of the treasury of the building fund, this report might here end. But it seems expedient to refer in a summary way to what remains yet to be done. That this may be generally understood, a description of the plan of the edifice to be built is presented.

The north wing of the new Academy of Natural Sciences of Philadelphia, at the southwest corner of Nineteenth and Race Streets, covers an area of 186 by 75 feet. It will have an elevation of 55 feet from the pavement to the cornice. It is in the collegiate Gothic style of architecture, and the exterior walls are faced with green serpentine from Brinton's quarries, and the openings are trimmed with drab-colored Ohio sandstone. The roof of slate, in the Mansard style, is crowned with a skylight.

The architectural appearance of the building when finished, will be, it is believed, as handsome as any other of its size in our city. It is fire-proof in construction, and will be thoroughly lighted, warmed, and ventilated.

At the eastern end of the cellar are two rooms, designed for the use of taxidermists, each 19 by 24 feet, one of which communicates with the museum above by a lift or dumb waiter of ample dimensions; and also two rooms, each 18 by 22 feet, for printing materials and presses.

On the eastern extremity of the first floor is provided a reading-room, curators' office, publication office, artists' room, wash-room and water-closets, and librarian's office, which connects with a fire-proof, the entrance hall and the library. Above these apartments, upon an entresol floor, are rooms for duplicate specimens, for correspondence, for microscopes, for lady artists, and ladies' room.

The library floor is 120 feet long by 60 feet wide. The ceiling is twenty feet in height, supported by fourteen wrought-iron columns, arranged in two rows with a space of twenty-four feet between the rows, the columns in each line standing sixteen feet apart. At the western end of the building, on the north and on the south sides of library, two rooms of ample size are provided for the botanical and entomological departments of the museum. These apartments are connected with the museum above by suitable lifts.

On each side of the library-room are to be four apartments, each 11 by 14 feet, designed for the use of committees and students who visit the institution to consult the library or museum. An alcove, leading to a large window, separates and isolates each of these rooms. A ground glass door and a small window will give abundant light to each. Bookcases opening into the library are to be placed against the external face of these eight committee rooms, and it is proposed to classify the books, as far as practicable, in such manner that those which treat of the subject to be studied in each room will be arranged around it for the greater convenience of students.

A gallery, the floor of which constitutes the ceiling of the committee rooms, surrounds the library, on a level with the entresol floors, and is continuous with them. It is fourteen feet wide, except where it bridges an alcove, and there its breadth is four feet, a vacancy of ten feet between its wall-side and the great window being left for the purpose of admitting light to the floor of the alcove and the library-room generally.

A circular window, two feet in diameter, is so placed between each two great windows as to give additional light to book cases which will stand on the gallery at right angles with the walls. It is estimated that there is space enough on the gallery of the library to arrange 15,000 volumes.

The free surface of the library floor will be 116 by 28 feet.

The approach to the museum is through the entrance on

Race Street, near 19th, by a flight of stairs. Its floor will be 180 feet in length and 60 feet wide. It is surrounded by two galleries 20 feet wide, supported by 20 iron columns. The floors of these galleries are to be constructed of slate tiles and iron. The area of floor-space, including that of the galleries, in the museum is 18,518 square feet, or double that of the existing academy.

The cases will be placed at right angles with the walls, both on the floor and galleries, between the windows, which are not opposite, but so placed that those of one side of the building give their light to the piers on the other. A sky-light 66 feet in length and 24 feet wide will assist in thoroughly lighting every part of the museum.

The walls of this wing of the Academy's building are now raised to about twenty-five feet above the footway of the street. They require to be built about twenty-nine feet higher before they are crowned with cornice and roof.

When the entire plan is realized this wing will be connected with a centre building and another wing on Cherry Street, on the same style of architecture. That part of the south wall of the wing in process of construction, which is of brick, shows the point where connection with the future building is to be made.

The centre building is designed to contain only such specimens as are illustrative of the mineralogy and geology, the fauna and flora, all the natural resources of Pennsylvania. The south wing will contain a laboratory and lecture-room, and afford space for archæological and ethnological collections, and future additions to the general museum.

Though seven years have been spent in reaching the present condition of our enterprise, let us not despair of its full accomplishment in a much shorter period. Scientific pursuits are growing daily in popular favor, and their usefulness is recognized more extensively than they ever have been. Our fellow-citizens are as public spirited and generous as those of any other locality, and appreciate the pleasure of giving substantial aid to every undertaking which is to contribute to the common good and the solid reputation of our city. No one can reasonably doubt now the sincerity of our design, or the fixedness of our purpose to establish in Philadelphia a home of the natural sciences, reputable to the city and worthy of the history of the Academy, in spite of the rivalry of similar institutions which are springing up and growing with marvellous rapidity in several parts of our vast country. Boston, Portland, New Haven, Albany, Chicago, San Francisco, Washington, New York, have each at least one institution devoted to the cultivation of natural science. Though many of them are younger than ours, they are approaching and in some particulars surpassing it The nation is to be congratulated that workshops and workmen in this vast field of research are increasing in numbers and excellence.

It is surely not to be set down to our discredit that, seeing such progress around us, we are reluctant to be seen by the world now, or in 1876, lagging in the rear. This reluctance is our apology, should our fellow-citizens find us importunate in soliciting them to aid our enterprise. Our conviction that it looks to no selfish end, but is seeking an advantage common to all the inhabitants of our city and commonwealth, enables us to be persistent solicitors, asking help for science and for young scientists who are not able to help themselves to a scientific abode. Neither drums nor trumpets can be used to encourage our steps or stir the spirit of the public in our behalf. We can merely invite attention to the solid benefits to society generally, which have resulted exclusively from the labors of scientists, such as Galvani, Volta, Galileo, Newton, Humboldt, Liebig, Humphry Davy, Benjamin Thompson (*alias* Count Rumford), Faraday, Linnæus, Cuvier, DeCandolle, Agassiz, and others of the class, whose works had their origin in great museums and laboratories, without which many of their labors could not have been pursued. In their influence on the progress of civilization and human thought, their work might be contrasted advantageously to our cause with that of the great artists, painters, and sculptors, work which we all admire and praise, and carefully foster. Yet the people of those European cities in which the most approved specimens of painting and statuary are now common and have been for centuries, are believed to be not more refined and chaste, honest and enlightened than those who live far from the influence of such beauties. Consideration of the native inhabitants of Rome, Naples, Florence, Paris in this connection, leads one to question whether living amidst the very best results of fine-art culture, decorating churches or displayed in vast galleries freely accessible to the populace, is not unpropitious to the development of true manhood and virtue in vulgar and ignorant people. The influence of pictures and statues upon beholders is entirely emotional and sentimental in character, sometimes kindling only sensual ideas which are not always as evanescent in effect as "the lascivious pleasings of a lute." But who is prepared to demonstrate that the fine arts, excepting architecture, are in any degree essential to the progress of the human mind, or that they have contributed in an important degree to originate and bring to the use of society any one of those comforts, conveniences, or luxuries which belong to the existing condition of civilization? To what famous picture or noted statue, modern or ancient, can be fairly ascribed, partly or wholly, the origin of anything as useful as the lucifer match, gas illumination, photography, the electric telegraph, the railroad, the steamship, the microscope, the telescope, all of which have resulted exclusively from the cultivation of the natural sciences? Painting and sculpture are only modes of written language employed to describe things and express thoughts, and, when deftly used by skilful hands, are as eloquent in awakening sentiment and emotion, giving pleasure or pain, as the speech of the orator or the poet's song. Yet this kind of language is no more prolific of useful discoveries than any other mode of talking, or other means of communicating ideas.

The fine arts are vast sources of pleasure and amusement, and will be more alluring and popular than the natural sciences and attract more numerous and munificent patrons, until it becomes as easy to perceive the beauties of God's laws as the beauties of expression of human thoughts in colors on canvas, or sculptured forms in marble. To thousands the cultivation of the fine arts is lucrative. Original scientific research rarely brings pecuniary profit. But, as has been well said, "the reward of the discoverer in natural science is, in all contingencies, great. To stand as it were between God and man, in the laboratory, the mine, the study, anywhere, and feel that within the few by-past minutes there has stolen into his mind what has hitherto been known to God alone, to reflect further on the many born and unborn who are to take this truth into their bosoms as a part of their sense of that primal mystery, is a privilege so high, and a pleasure so overwhelming as to sink in utter insignificance, not only the toils of research, but all the emanations of jealousy and prejudice, which so often attend the first coming of truths before the world."

It should not be forgotten that extensive collections of natural objects, a library and a well-furnished laboratory are indispensable implements to those engaged in original research. Besides serving the purposes of science a vast museum, such as that belonging to this institution, is, at the same time, a continuous source of popular enjoyment and instruction, and therefore a centre which is attractive to people far and near, and may often serve to divert young men from various sensual and expensive amusements prejudicial both to health and morality, to which very many are unfortunately allured in every large city, for lack of interest in any rational or profitable method of passing their leisure hours. Even if no better reason could be assigned, it ought to be sufficient claim on the liberality of our fellow citizens that all children who visit and examine the contents of such a museum find pleasure which is salutary in every sense. Natural science is now recognized to be an essential part of liberal education. On this account, as well as for the sake of children, a natural history museum should be established and maintained in this and every other great city of our country.

The appeal we are making will be heard only by the intelligent and thoughtful, and be answered only by the public spirited and generous, for

"Gladdest of all is he who gives,
Discovering that his gift has grace."

The history of similar efforts in other populations which have had larger success begets and sustains a hope that our exertion may be fully rewarded. We congratulate New York on the commencement and rapid progress of a vast edifice for the purposes of natural science. We are told that, immediately after the passage of the act of 1871, which gave land in Central Park, and $500,000 for natural history purposes, the Board of Commissioners of Parks consulted with the Museum of Natural History, and decided that the proposed new building should be erected on Manhattan Square, a plot of ground bounded by Eighth and Ninth Avenues, and Seventy-seventh and Eighty-first Streets. The work was commenced in the autumn of last year, and has since then progressed so rapidly that the whole of the massive foundation has been laid and part of the basement built. The museum, as designed by Mr. Calvert Vaux, the architect, is to be in the Venetian Gothic style, and when completed will provide three times the space of the British Museum. Its walls will inclose four courts, each 200 feet square. In these will be planted flowers and shrubs of different countries. The entire building will be 700 by 800 feet, and it is estimated that the saloons and halls will be of such capacity that 10,000 persons can view the specimens at the same time. The cost of the entire building will not fall far short of twelve millions of dollars. That part of the building now in the course of erection is situated on Seventy-seventh Street, and forms only one-seventeenth part of the entire structure. This section will be so arranged as to be complete in itself for the present, and when the entire work is finished will be a suitable part of a harmonious whole. It will cost $500,000, the sum allowed by the Legislature; the other part of the $12,000,000 will have to be raised by private subscription, or by further City or State appropriations. This section is to be completed for occupation by the spring of 1875. The society for whose use this building is being erected was organized in 1869—three years after the Board of Trustees of the Building-fund of the Academy of Natural Sciences of Philadelphia was created, and fifty-seven years after our Society was founded.

The Legislature of Massachusetts in 1871 appropriated for the use of the museum of Comparative Zoology $50,000, and in 1873, $25,000. During this year Mr. Alexander Agassiz presented $25,000 and Mr. Shaw $100,000 for the same purpose. In October last, the late and universally lamented Professor Louis Agassiz announced that Mr. Anderson had consented to make the natural history school, established by his munificent gift of the island of Penikese and $50,000, a part of the Museum of Comparative Zoology. Mr. Anderson's contributions to the cause of the natural sciences are estimated at $150,000.

Prior to the contributions made this year, amounting to $150,000, besides the Penikese establishment, $400,000 had been spent on the Museum of Comparative Zoology at Cambridge, which was founded in 1847. Of this sum $215,000 have been contributed by the State. The annual income of its funded capital is $10,500.

It is said that $30,000 worth of alcohol were used in preserving the collections made by Professor Agassiz in Brazil; and that more than 3500 gallons have been used this year in repacking those of the Hassler expedition.

The Boston Society of Natural History, founded April, 1830, is an enduring testimonial of the intelligent liberality of its neighbors. The report of the treasurer of the Society, April 30, 1872, shows that it has a yearly income from invested funds, created by donations and bequests, of $18,391, besides $1450, received in initiation fees, and annual contributions from members. The Society expends $6028 in salaries; and on account of printing, in excess of the proceeds of sales of publications, $2174. After defraying all expenses for the year, there was a balance in the treasury of $3649 89.

At New Haven, the degree of encouragement extended to education and to the cultivation of the natural sciences is very gratifying. "The Catalogue of Yale," June 1, 1873, indicates that its museums, and libraries, and art galleries will become rivals of the best in a very few years.

These instances are sufficient to show why we are likely to be left lagging in the rear, notwithstanding the vast museum and great library, collected through volunteer labors and the generosity of members of the Society, and others. The original researches made by the Institution are recorded in its published "Journal" and "Proceedings." In any and every sense its labors are creditable, and in no respect inferior to work in similar societies of our country. But our progress is hampered, mainly by want of a building, and a too limited income. The last report of the treasurer, Dec. 29, 1873, shows that in the past year there was received on account of initiation fees, semi-annual contributions from members, life-memberships, etc. $3716, and from special funds, $1870, making the income of the year $5586.

Including $1603 85 expended on account of salaries to janitors and librarian, the total expenditures for the year amounted to $6168. The balance in the treasury is less than $140, a balance wholly ascribable to exemption from taxes by an act of the Legislature which the new Constitution of the Commonwealth repeals.

This exemption from taxation, which now seems likely to cease, is the sole assistance the Society has received from the State since its foundation in 1812. No conclusive reason is apparent why the great and enlightened Commonwealth of Pennsylvania, rich, and populous, and prosperous, should not contribute as much at least as private citizens have done to foster the pursuit of the natural sciences. Massachusetts, in which brain-force is sedulously cultivated, and New York, have set precedents which Pennsylvania might follow, without endangering self-respect, greatly to the advantage of her citizens. The perpetuation of the Republic is contingent upon the intelligence of the people. Therefore, public policy demands that every possible encouragement should be given to every rational method devised to acquire knowledge and diffuse it among the people.

Notwithstanding its pecuniary limit the work of the Society goes on. During the past year large and valuable additions to the museum and library have been made, and much that was hitherto unknown has been ascertained and described by members. The arrangement of the conchological collection, which is now equal, in scientific value, to any other in the world, has been completed; a volunteer labor of seven years' duration by members of the Conchological Section of the Academy.

The classification of this collection required the fixing in appropriate trays 76,479 specimens, and the writing of 24,285, labels, in order to fully display 14,161 species. In the process of verifying these, and eliminating duplicates, several thousand names were transferred from the catalogues to the synonymy; thus reducing to this extent the number of species previously supposed to exist. Several families and genera are so complete that no known representative of them is wanting. To assist the Chicago Academy of Science in acquiring collections in this department to replace those destroyed in the great conflagration, 863 species determined and appropriately labelled, have been sent to it; and 100 species in addition are now ready to be transmitted. Besides these there are nearly or about 5000 lots of duplicates, estimated at 25,000 specimens in all.

The Microscopical and Biological Section of the Academy has been active. Some of its work may be mentioned. Dr. James Tyson presented the results of his microscopic study of blood and epithelium; Dr. Albert Fricke reported his investigation of the horse epidemic of 1872; Mr. D. S. Holman exhibited his peculiar microscopic slides which are valuable improvements, and recently he has devised a method of demonstrating to an audience the circulation of the blood in animals, and of the sap in plants, which will be satisfactory to teachers and lecturers; and Dr. J. G. Hunt made interesting and valuable communications; on his discovery that the common truffle grows in the neighborhood of Philadelphia; on the use of hæmatoxylon in the preparation of stainings of both vegetable and animal tissues, and he demonstrated that a curious turbidity of the water in the reservoir of the Camden Water Works, which had puzzled different scientists, was due to the growth of the Trichormus thompsoni. He exhibited specimens of this microscopic plant, and pointed out a method of preventing its development, which, if adopted, will save thousands of dollars to our own and other municipalities in maintaining the purity of water supplied to the people.

The recorded and published Proceedings of the Academy show that the Society has contributed in the past year to the advancement of science, and that its labors in this direction are worthy of commendation and encouragement.

It will be always to the credit of Philadelphia that among its citizens are those who have given an aggregate of $120,250 in the past seven years* towards the construction of a new building for the purposes of a society, formed for the cultivation of the natural sciences, and during the same period even larger amounts have been given for the advancement of the fine arts, for educational institutions, for hospitals and other charitable establishments. A bountiful public spirit is spreading among us. The members of the Academy have reason to congratulate themselves that the career of the Society has won for it a high place in public estimation, made manifest in the favors it has received, and for which they are grateful. But numerous and liberal as contributions towards the accomplishment of this enterprise have been, its present condition compels us to seek earnestly a large accession to their number. There is no reason to doubt now that the new building will be finished sooner or later; but a certain patriotic pride urges that this work should be entirely completed by the spring of 1876, when the world has been invited to come and inspect the progress in civilization made by the nation during the first hundred years of its existence.

Let us hope that those who truly estimate the importance and value of the diffusion of knowledge of the works of nature, and the promotion of original investigations in this great field, will at once give whatever aid they can. This work should not be left to be done by the opulent few. All may contribute something. The cost of knowledge is vast. But generally difused it is worth more to the nation than all it can cost, more than any amount of money hoarded in individual hands. The wealth of a millionaire who ignores the common obligation of citizens to contribute to the public welfare is, in one sense, of no more value to the community in which he lives, than the daily hire won by the needy laborer, and entitles him to no greater respect.

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* Taking the average population during seven years at 650,000, this contribution is equal to a yearly average of about $2\frac{6}{10}$ cents a head.

Those who assist the cause of education in any of the departments according to their means, aid the ignorant and vulgar to be wiser and better, and thus help to perfect our system of government. It is believed that many of its imperfections of administration are fairly ascriable to the ignorance of the majority. Therefore, as long as intelligent and educated men of wealth and leisure selfishly abstain from public affairs, and remain indifferent to the intellectual condition and progress of illiterate voters, among whom they dwell, so long will they find themselves unsatisfactorily governed. In this connection much remains to be done in our midst, through the joint efforts of individuals, to enlighten the masses, and accelerate the progress of all those pursuits which belong to civilization and among these, the study of nature especially claims consideration.

In what we have attempted to urge, we hope there may be found justification, not only for the importunate appeal we make, but also for the generous, intelligent, and public-spirited to contribute to our object.

W. S. W. RUSCHENBERGER,
Chairman of the Board of Trustees.